

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY



PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

To:

OKABE, Masao

**No. 602, Fuji Bldg., 2-3,
Marunouchi 3-chome,
Chiyoda-ku, Tokyo
100-0005**

Date of mailing
(day/month/year)

25. 5. 2004

Applicant's or agent's file reference

CFO17975WO

FOR FURTHER ACTION

See paragraph 2 below

International application No.

PCT/JP2004/004072

International filing date (day/month/year)

24.03.2004

Priority date (day/month/year)

26.03.2003

International Patent Classification (IPC) or both national classification and IPC

Int.Cl. **H01L 31/06**

Applicant

CANON KABUSHIKI KAISYA

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/JP

Japan Patent Office

3-4-3, Kasumigaseki, Chiyoda-ku, Tokyo 100-8915, Japan

Authorized officer

Shoji HAMADA

Telephone No. +81-3-3581-1101 Ext. 3254

2K

9207

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/JP2004/004072

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This opinion has been established on the basis of a translation from the original language into the following language _____, which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).

2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

a. type of material

- ☐ a sequence listing
☐ table(s) related to the sequence listing

b. format of material

- ☐ in written format
☐ in computer readable form

c. time of filing/furnishing

- ☐ contained in the international application as filed.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	<u>1 - 4</u>	YES
	Claims		NO
Inventive step (IS)	Claims		YES
	Claims	<u>1 - 4</u>	NO
Industrial applicability (IA)	Claims	<u>1 - 4</u>	YES
	Claims		NO

2. Citations and explanations

D1: JP 2001-217442 A
D2: JP 3- 228324 A
D3: JP 9-312258 A
D4: JP 9-312258 A
D5: JP 4-225282 A

1. D1 disclose a solar cell, having a SUS substrate (1), an n-type polycrystalline silicon layer (2), and a polycrystalline silicon layer (4, etc). See, especially, figure 2. D1 also mentions that the n-type polycrystalline silicon layer (2) can be also composed of microcrystalline or amorphous ([0010]), and that the SUS substrate (1) can be substituted by metallurgical silicon (12)([0014]).

Taking into account those disclosures in D1, the ambiguities of claim 1 as explained in the Box No.VIII of this ISO, and the fact that "the layer having an amorphous silicon phase and a microcrystalline silicon phase mixed together" in claim 1 is not distinguishable from the said microcrystalline or amorphous silicon layer (2) in D1, the claim 1 is considered to be obvious by a skill man from D1.

Each limitation by claims 2-3 is considered to be merely a matter of design.

Also taking into account the fact that the term "grown with the microcrystalline silicon phase as a seed" in claim 4 does not limit this product claim, claim 4 is also considered to be obvious by a skill man from D1.

(In this regard, the process of fabricating a polycrystalline silicon layer, using a underneath layer as a kernel, is also found to be well-known in this art. See D4 or D5, for example.)

2. D2 concerns a method for depositing a polycrystalline silicon layer, used for solar cell, in which disclosed a solar cell, having a metallurgical silicon substrate (1), a first polycrystalline silicon layer (3), a second polycrystalline silicon layer (11). See, especially, figure 2. D2 also mentions that the first polycrystalline silicon layer (3) is recrystallized by lamp anneal (p.2).

(continued to the Supplemental Box)

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/JP2004/004072

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

Claim 1 is unclear in that the elements constituting the solar cell are ambiguous, especially because (1) the meaning indicated by the term "formed by allowing" is not clear, (2) it is not clear whether the member(s) indicated by the terms "a base" and "a substrate" is(are) identical or not, and (3) it is not clear what element is indicated by the term "which is obtained by melting metal-grade silicon and solidifying the silicon in one direction".

The unclear term "formed by allowing a high-purity polycrystalline silicon layer" appears also to be redundant, because it merely describes a process while claim 1 is a product claim.

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of: **Box No. V**

While the said silicon layer (3) is described as polycrystalline in this document, since a crystal silicon layer fabricated by laser anneal can be also described as a microcrystalline phase in the midst of an amorphous phase (see, for example, [0079] of D3), "the layer having an amorphous silicon phase and a microcrystalline silicon phase mixed together" in claim 1 or 4 is not clearly distinguishable from the said silicon layer (3) in D2.

As a result, the claims 1-4 are considered to be obvious by a skill man also from D2.